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1. A method for controlling multiple access by transmission units to a network, for time division multiplexed data transmission within cyclically arranged time slots, comprising the following steps:

determining by a plurality of contending transmission units during a time slot within one cycle that the corresponding time slot of the following cycle will be available for data transmission,

comparing priority values by the contending transmission units within the corresponding time slot of the following cycle, wherein that one of the contending transmission units which has the highest priority wins the contention, and

reserving the corresponding time slot of a further following cycle for data transmission by the winning transmission unit.

2. A method according to claim 1 wherein said priority values are calculated depending on the type, the amount and/or the wait time of data to be transmitted by the contending transmission units.

3. A method according to claim 2, wherein the priority values distinguish whether data to be transmitted belong to switch signals, real time connections or data transfer services.

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Art Unit: ***

4. A method according to claim 3, wherein said switch signals have priority over real time connections and these have priority over data transfer services, wherein data transfer services receive different priority depending on the amount of data and/or the wait time of the respective transmission unit.

5. A method according to claim 1, wherein a value (WS) is determined to indicate the amount of data to be transmitted by a transmission unit and/or the wait time of the transmission unit with the data ready to transmit, and said transmission unit accesses the network for reservation of a further time slot in addition to a time slot already reserved when said value (WS) exceeds a predetermined threshold (WS_{Max}).

6. A method according to claim 5, wherein a transmission unit having made reservation for a plurality of time slots releases one of the reserved time slots when said value (WS) lowers beyond a predetermined other threshold value (WS_{Min}).

7. A method according to claim 1, wherein, in case of colliding data transmissions by two transmission units within one time slot, said transmissions are interrupted or release said one time slot by both transmission units and are resumed each after a random time delay.

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Art Unit: ***

8. A method according to claim 1, wherein data transfer services to reserve a time slot for only a limited number of cycles and, thereafter, they can renew the reservation of said time slot only if not all other time slots are occupied.

9. A method according to claim 1, wherein a real time service reserves a time slot for an unlimited number of cycles.

10. A method according to claim 1, wherein reservations of time slots are made by the transmission units themselves without central control.

11. A method according to claim 1, wherein a transmission unit which ends data transmission in a time slot indicates a release of the time slot together with the last data transmission therein.

12. A method for multiple access by transmission units to a network, for data transmission by time division multiplex within cyclically arranged time slots, wherein

a transmission unit having reserved a time slot determines a value (NS) depending on the amount of data it has to transmit and/or depending on the wait time of the data for transmission, and if said value (NS) exceeds a predetermined threshold value (NS_{MAX}), said transmission unit accesses the network for reservation of a further time slot, and

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Art Unit: ***

a transmission unit having more than one time slot reserved releases one of said reserved time slots when said value (WS) falls below another predetermined threshold value (WS_{crit}).

13. A method for multiple access by transmission units to a network, for data transmission by time division multiplex within cyclically arranged time slots, wherein

in case of colliding data transmissions by two transmission units within one time slot, said time slot is released by both transmission units and another access by each transmission unit to the network is made only after a random time delay.

Please add claims 14 and 15 as follows:

14. (New) A method for time division multiplexed data transmission within cyclically arranged time slots, comprising the following steps:

providing each of a plurality of contending transmission units within one of said time slots with a respective priority value;

comparing the priority values of the contending transmission units within the corresponding time slot of the following cycle, wherein the contending transmission unit with the highest priority wins the

contention, and reserving the corresponding time slot of a further following cycle for data transmission by the winning transmission unit.

15. (New) The method according to claim 14, further comprising determining from the plurality of contending transmission units whether a corresponding time slot of a following cycle will be available for data transmission.

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